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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/537,996 | 06/03/2005 | Christianne Eichler | AKR002-0544 | 8748 |
| 40440 7590 10/31/2007 WOLF, BLOCK, SCHORR & SOLIS-COHEN LLP 1650 ARCH STREET, 22ND FLOOR PHILADELPHIA, PA 19103-2334 | | | EXAMINER LU, JIPING | |
| | | | ART UNIT 3749 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/537,996

Applicant(s)

EICHLER, CHRISTIANNE

Examiner

Jiping Lu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) 24 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-23 and 26-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/3/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species I, Fig. 2 in the reply filed on 10/12/07 is acknowledged.
2. Claims 24-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/12/07.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 16-23, 26-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear what the claimed open or closed loop manner is.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 16-23, 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamikawa et al. (U. S. Pat. 5,940,985).

Kamikawa et al. discloses a method of drying substrates after a wet treatment thereof in treatment liquid including the steps of forming a gas mixture that comprises a carrier gas (within 227) and an active substituent 153, and that reduces the surface tension of the treatment liquid, by conveying the carrier gas through a liquid of the active substituent (at 220); actively controlling a concentration of the active substituent in the gas mixture in an open or closed loop manner (by controlling 228, see col. 17, lines 2-15); actively controlling a temperature of the liquid of the active substituent to a predetermined temperature in an open or closed loop manner (by heater 223, temperature indicator 229, and flow rate controller 228, see col. 16, lines 34-35, col. 17, lines 20-22 and claim 12); applying the gas mixture to the treatment liquid (thru passage 215); and moving the substrates W out of the treatment liquid by generating a relative movement between the substrates and the treatment liquid (see Fig. 11). The gas mixture 215 is formed by mixing essentially pure carrier gas 215c and a mixture of carrier gas 227 and the active substituent 153 (see Fig. 11). The temperature of the liquid of the active substituent is kept essentially constant (at room temperature within tank 226). The temperature of the liquid of the active substituent is altered in a controlled manner throughout a drying process (within 220). The flow rate of the carried gas is controlled (col. 15, lines 26-27). The concentration of the active substituent in the gas mixture is measured and the temperature of the liquid of the active

substituent and the flow rate of the carrier gas are adjusted as a function of the measured concentration (col. 17, lines 2-25 and claims 1, 3). For claims 26-27, see Fig. 16.

7. Claims 16,18, 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamikawa et al. (U. S. Pat. 6,029,371).

Kamikawa et al. discloses a method of drying substrates after a wet treatment thereof in treatment liquid including the steps of forming a gas mixture that comprises a carrier gas 52 and an active substituent 46, and that reduces the surface tension of the treatment liquid, by conveying the carrier gas through a liquid of the active substituent (at mixing section within 41); actively controlling a concentration of the active substituent in the gas mixture in an open or closed loop manner (by controlling pump 50); actively controlling a temperature of the liquid of the active substituent to a predetermined temperature in an open or closed loop manner (by adjusting heater 44); applying the gas mixture to the treatment liquid (thru passage 32); and moving the substrates W out of the treatment liquid by generating a relative movement between the substrates and the treatment liquid (by discharge liquid from 37). The temperature of the liquid of the active substituent is kept essentially constant (at room temperature within tank 48). The flow rate of the carried gas is controlled (by flowmeter 60).

8. Claims 16-19, 21-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Puri et al.(U. S. Pat. 6,681,781).

Puri et al. discloses a method of drying substrates after a wet treatment thereof in treatment liquid including the steps of forming a gas mixture that comprises a carrier gas 258 and an active substituent 153, and that reduces the surface tension of the treatment liquid, by conveying the carrier gas through a liquid of the active substituent (within 242); actively

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controlling a concentration of the active substituent in the gas mixture in an open or closed loop manner (by controlling valves in lines 240,244,246); actively controlling a temperature of the liquid of the active substituent to a predetermined temperature in an open or closed loop manner (by heaters in lines 240, 244, 246, not shown, col. 15, lines 18-21); applying the gas mixture to the treatment liquid (thru line 244); and moving the substrates 254 out of the treatment liquid by generating a relative movement between the substrates and the treatment liquid (by discharge liquid from 221). The gas mixture (within 252) is formed by mixing essentially pure carrier gas 258 (thru line 246) and a mixture (thru line 244) of carrier gas 258 (thru line 240) and the active substituent (within 242). The temperature of the liquid of the active substituent is kept essentially constant (at room temperature within tank 242 with heaters off). The temperature of the liquid of the active substituent is altered in a controlled manner throughout a drying process (with controlling heaters and valves in lines 240, 244, 246). The flow rate of the carried gas is controlled (by valves in lines 240, 246).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamikawa et al. (U. S. Pat. 5,940,985 or 6,029,371) or Puri et al.(U. S. Pat. 6,681,781).

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The drying method of Kamikawa et al. as above includes all that is recited in claims 28-30 except for percentage of the IPA concentration in the gas mixture. It would have been obvious to one having ordinary skill in the art at the time the invention was made to keep the IPA concentration in the gas mixture at claimed range in order to obtain the optimum drying result, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

11. Claims 17, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamikawa et al. (U. S. Pat. 6,029,371) in view of Olesen et al. (U. S. Pat. 6,122,837).

The drying method of Kamikawa et al. as above includes all that is recited in claims 17, 19 except for the gas mixture is formed by mixing essentially pure carrier gas and a mixture of carrier gas and the active substituent and the temperature of the liquid of the active substituent is altered in a controlled manner throughout a drying process. Olesen et al. teaches a concept of forming gas mixture (at 62) by mixing essentially pure carrier gas (at 96) and a mixture (at 118) of carrier gas 102 and the active substituent (within 94). Olesen et al. also teaches a concept of altering the temperature of the liquid of the active substituent in a controlled manner throughout a drying process (by controlling the heating of carrier gas thru variable power supply 88). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying method of Kamikawa et al. to include steps of forming gas mixture by mixing essentially pure carrier gas and a mixture of carrier gas and the active substituent and altering the temperature of the liquid of the active substituent in a controlled

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manner throughout a drying process as taught by Olesen et al. in order to improve the drying efficiency.

12. Claims 20, 23, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Puri et al.(U. S. Pat. 6,681,781) in view of Kamikawa et al. (U. S. Pat. 5,940,985).

The drying method of Puri et al. as above includes all that is recited in claims 20, 23, 26-27 except for the concentration of the active substituent in the gas mixture is measured and the temperature of the liquid of the active substituent and flow rate of the carrier gas is adjusted as a function of the measured concentration. Kamikawa et al. teaches a concept of measuring the concentration of the active substituent in the gas mixture and controlling the temperature of the liquid of the active substituent and the flow rate of the carrier gas are adjusted as a function of the measured concentration (col. 17, lines 2-25 and claims 1, 3). Kamikawa et al. also teaches a concept of altering the concentration of the active substituent in the gas mixture as a function of a position of the substrates relative to a surface of the treatment liquid and increasing the concentration of the active substituent in the gas mixture as a cross-sectional surface between the substrates and the treatment liquid increases and decreasing the concentration of the active substituent in the gas mixture as a cross-sectional surface between the substrates and the treatment liquid decreases (see Figs. 15, 16). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying method of Puri et al. to include the steps of measuring the concentration of the active substituent in the gas mixture and adjusting the temperature of the liquid of the active substituent and flow rate of the carrier gas as a function of the measured concentration and increasing the concentration of the active substituent in the gas mixture as a cross-sectional surface between the substrates and the

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treatment liquid increases and decreasing the concentration of the active substituent in the gas mixture as a cross-sectional surface between the substrates and the treatment liquid decreases as taught by Kamikawa et al. in order to improve the drying efficiency.

Conclusion

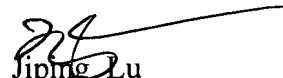
13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chen et al. (U. S. Pat. 6,928,748) and Yang et al. (U. S. Pub. 2004/0194806) all discloses a wafer drying process using IPA concentration detector and temperature sensor same as claimed. However, current application has priority date before the filing date of above two references.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiping Lu whose telephone number is 571 272 4878. The examiner can normally be reached on Monday-Friday, 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEVEN B. MCALLISTER can be reached on 571 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Jiping Lu
Primary Examiner
Art Unit 3749

J. L.